Strudel Pulmonary Review

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Aspiration Pneumonia

35 year old Wisconsin man presents with several days fever, shortness of breath. Exam reveals inspiratory crackles involving left lower lung base. Dx?

Aspiration pneumonia

Predisposing factors?

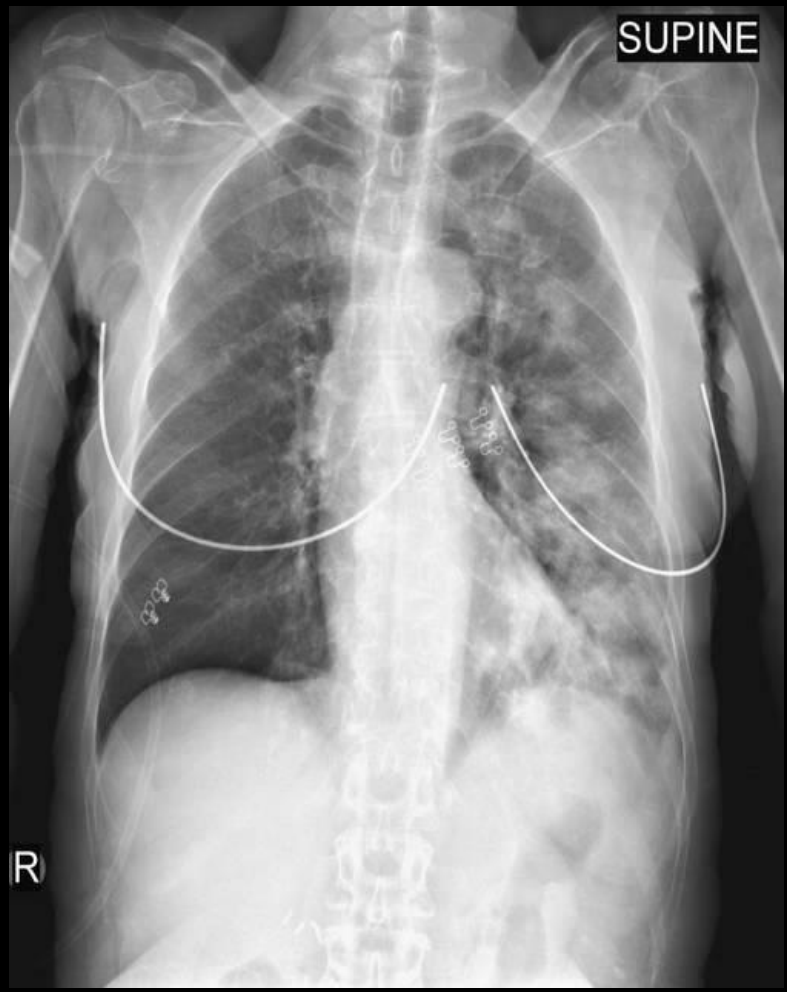
Alcoholism, Anesthesia, Dysphagia, Poor dentition

Complications?

Lung Abscess-anaerobes

Tx?

Amox/clav, amp/sulbactam, vanc, clindamycin, zosyn



Case courtesy of Yaïr Glick, Radiopaedia.org, rID: 53647

Community Acquired Pneumonia

55-year-old man presenting with several day history of fevers, pain with deep inspiration, cough productive of greenish sputum. Exam reveals tachypnea, consolidation, inspiratory crackles involving the left lower lung base. Workup?

2 view CXR (sensitive), sputum gram stain, sputum culture (hospitalized)

Dx?

Community acquired pneumonia (lobar)

Common bugs?

Strep pneumo, H flu

In COPD patients?

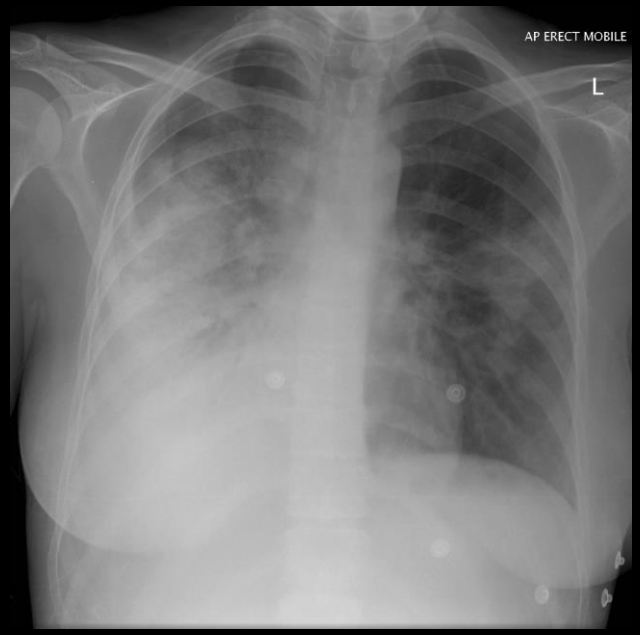
H flu

Superinfection following influenza virus infection?

Staph aureus

Outpatient Tx?

Doxy/macrolide, Third gen cephalosporin + macrolide, Augmentin



Case courtesy of Frank Gaillard, Radiopaedia.org, rID: 11009

Cases

43 y.o. F presents with sore throat, cough, and malaise. On exam, she is afebrile without tonsillar exudate but with pharyngeal erythema.

Dx?

Viral Pharyngitis (most commonly adeno)

Tx?

Supportive care

50 y.o. M presents with 1 week of persistent congestion and sore throat, with a 2-day history of cough. A CXR is obtained in clinic and is unremarkable.

Dx?

Acute Bronchitis (likely viral)

Tx?

Supportive care

Viral Infections

- Very high-yield
  - often conservative management
  - Look for cough, rhinorrhea and mention of a seasonal pattern
- Influenza
  - Winter months, vaccination is almost always indicated
  - Oseltamivir (Tamiflu) if within 48hrs of onset OR if severe requiring hospitalization

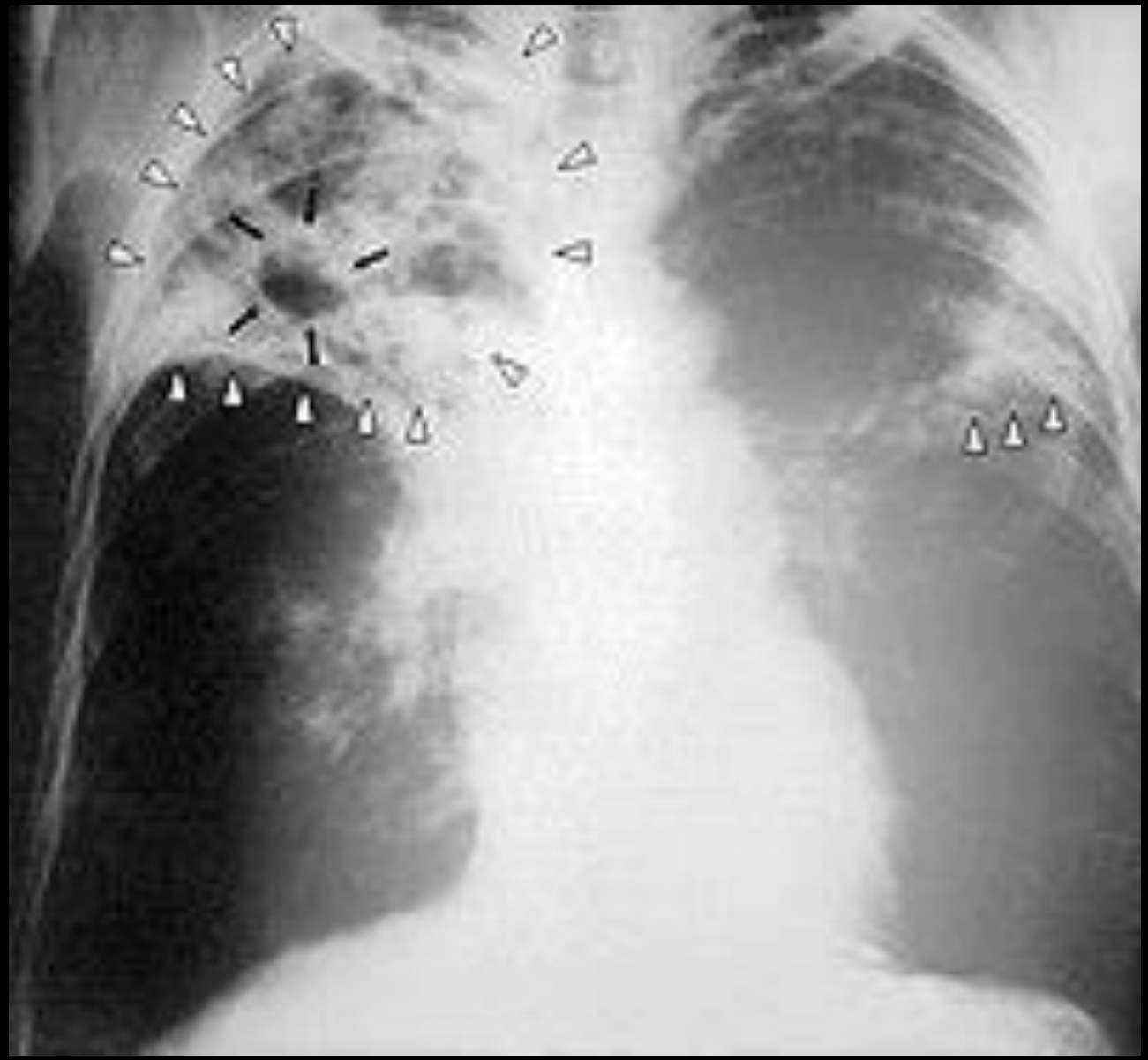
HY Case: A 35y.o. M presents to the ED. Per his report, he had been sick for a week, then felt a bit better, then started feeling much worse today. He appears ill, is febrile, and is hypotensive. Notably, he coughs up a small amount of blood during the encounter.

Dx?

Secondary Bacterial PNA

Cause?

S. aureus (incredibly high yield)



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24 y.o. M presents with one week of progressive fatigue which is now severe, cough, sore throat, and fevers. On exam, he has pharyngitis, splenomegaly, and posterior cervical lymphadenopathy. His labs show transaminitis and leukocytosis with >10% atypical lymphocytes.

Dx?

Infectious Mononucleosis (EBV)

How to Dx?

Serology > Monospot (Heterophile antibody)

Anticipatory guidance?

No contact sports for ~4 weeks (splenic rupture)

What if all your tests come back negative?

CMV – very similar presentation (could tx with ganciclovir/valganciclovir)

What if he presents with a diffuse maculopapular (lol) rash?

He probably took old antibiotics (typically an aminopenicillin like amoxicillin)

20 y.o. M presents with a 5-day history of nasal congestion and intermittent fevers. He has pain to palpation of the maxillary sinuses.

Most likely dx?

Viral rhinosinusitis

Despite conservative management, the patient continues to have symptoms. On day 11 of his symptoms, he comes back to the office and some purulence can be seen on exam of the nares.

Dx?

Bacterial rhinosinusitis (might have been the whole time, but viral URI is the most common RF)

Tx?

Amoxicillin +/- clavulanate

Most common bugs?

Strep pneumo, H. influenzae, M. catarrhalis

56 y.o. M with PMHx signifiant for HTN, DM, and obesity presents to the ED with 3d of cough productive of yellow sputum, fever, and malaise. He is febrile, tachypneic, and has decreased breath sounds over the RLL. Labs show leukocytosis with a left shift.

Next best step?

CXR (Dx can be made with: clinical picture + infiltrate)

Tx?

Depends on the patient! For this pt (has comorbidities, and is stable)?

Cefpodoxime (PO)/Augmentin(PO)/Ceftriaxone(IV) + Azithro OR Doxy

What if you only wanted to use one drug?

Fluoroquinolone monotherapy (moxi or levo NOT cipro)

What if it's a 24 y.o. with no PMHx?

Consider Amoxicillin, Doxy, or possibly Azithromycin (if pneumococcal macrolide resistance is locally decent)

What if you need to admit (septic, unstable, lots of comorbidities)?

IV Ceftriaxone + Azithro OR Doxy

New patient – 65 y.o. F on the floor starts fevering after being extubated for AECOPD 2 days ago. WBC count is 18 with a left shift. She is more hypotensive and tachypneic, and now has to use 2L O2 via NC when she has been on room air for the last day.

Likely dx?

VAP (subtype of HAP)

Empiric tx?

Vancomycin + Pip/Tazo OR Cefepime OR Meropenem + FQ/Aminoglycoside (maybe)

60 y.o. smoker presents with fever, diarrhea, and a productive cough. He recently returned from a business conference where he stayed in a hotel. CXR shows no distinct lobar infiltrate, but does have some diffuse interstitial opacities.

Dx?

Legionaire's disease (Legionella)

How to diagnose?

Urine antigen (can send PCR too but not as fast...)

Expected lab (on exams)?

Hyponatremia

Tx?

Fluoroquinolones/Macrolides

1976 meeting of American Legion in Philadelphia

25 y.o. M presents with 4d of dry cough, fatigue, and malaise. He is tachypneic and febrile on exam, and auscultation reveals diffuse crackles throughout all lung fields. A CXR shows reticulonodular opacities. Labs show anemia.

Dx?

Atypical PNA – Mycoplasma, Chlamydia

"Walking pneumonia"

Tx?

Macrolide, Doxy, or FQ

Cause of anemia?

IgM Cold-agglutinin hemolytic anemia (expect high LDH, low haptoglobin)

A 45 y.o. F presents to the ED with CC of hemoptysis, fever, weight loss, and night sweats over the last week. She recently immigrated from SE Asia. Exam reveals decreased breath sounds over the LLL. A CXR finds a granuloma and associated infiltrate of the LLL, along with hilar lymphadenopathy on the left side.

Best next step?

AIRBORNE PRECAUTIONS – HY, also need to REPORT

Treatment?

RIPE for 2 months, then RI for 4 months (4 for 2 then 2 for 4)

Side Effects!

Rifampin?

Orange color of body fluids, CYP450 inducer, hepatotoxicity

Isoniazid?

B6 (pyridoxine) deficiency -> neuropathy, DRUG INDUCED LUPUS

Pyrazinamide

Gout (hyperuricemia)

Ethambutol

Optic neuritis (red-green colorblindness)

40 y.o. farmer from Wisconsin has fever, cough, painful bumps on his shins, and hepatosplenomegaly on exam. Dx?

Histoplasmosis (key feature = erythema nodosum, narrow based budding)

Best next step in evaluation?

Urine antigen test

25 y.o. M who returned from spring break in Pheonix has cough, fever, night sweats, and painful nodules on his shins. Dx?

Coccidioidomycosis (also classically has EN, spherules)

35 y.o. F immigrant from Ecuador presents to the ED with painful mucosal ulcers, cervical lymphadenopathy, and gnarly skin lesions. Dx?

Paracoccidioidomycosis (Ship's wheel)

50 y.o. M in Ohio presents with fever, cough, raised skin lesions, pain in his back, ribs, and right femur. Dx?

Blastomycosis (Broad-based budding)

Treatment for all of these?

Itraconazole -> Amphotericin B if severe

70 y.o. M with 50 pack-year hx of smoking, COPD, HTN, and T2DM presents with colicky right flank pain and hematuria. He is found to have a calcium level of 11.5. Dx?

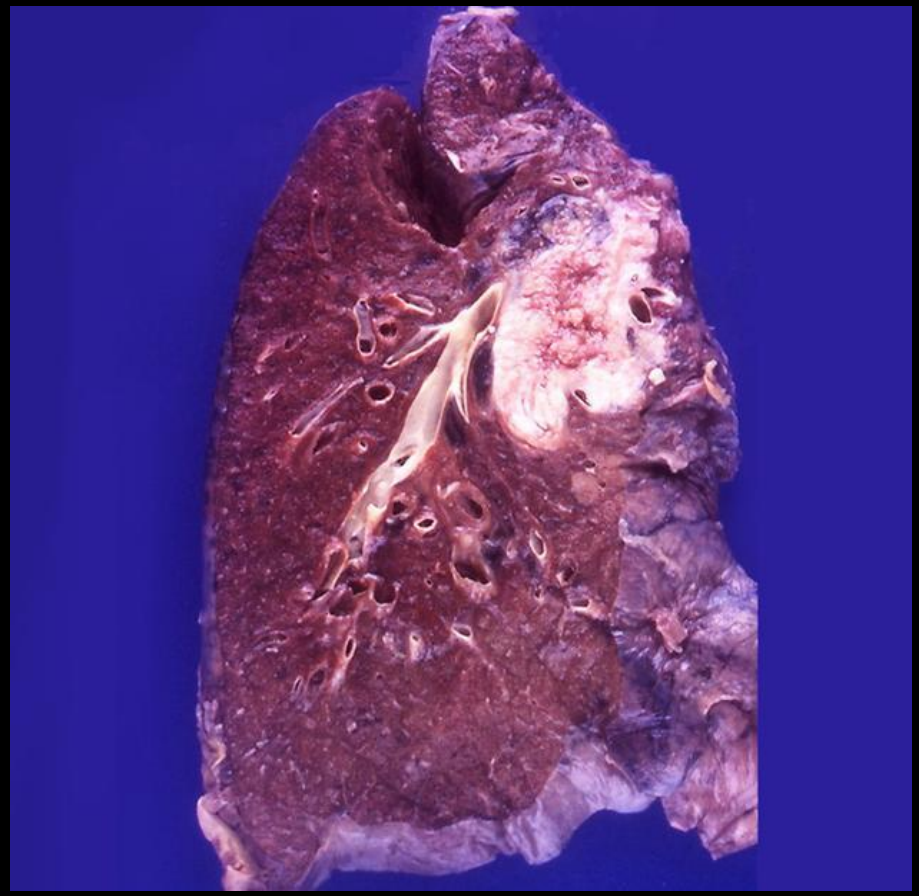
Squamous Cell CA of the lung

Next best step?

CXR -> CT if suspicous of malignancy (expect a CENTRAL location)

Evaluation of hypercalcemia?

PTHrP level



Rosen Y. Case study, Radiopaedia.org (Accessed on 29 Aug 2024) https://doi.org/10.53347/rID-9258

60 y.o. F with 50 pack-year hx of smoking, COPD, HTN, and T2DM presents after a fall and hip fracture. She reports month-long hx of lethargy, weight gain, and weakness. On exam, she has a buffalo hump and increased hair growth on the face. There's a central nodule on CXR. Dx?

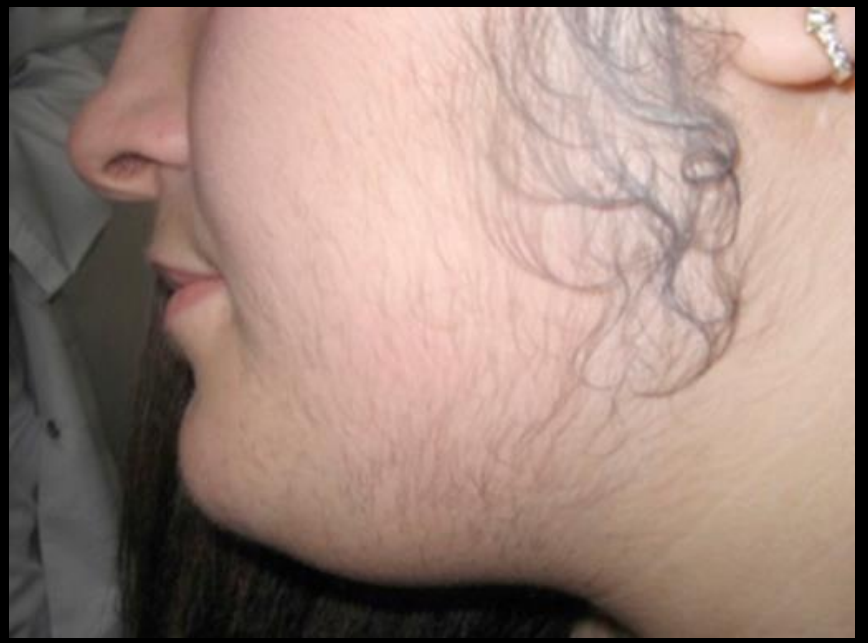
Small Cell CA of the lung

Paraneoplastic Cushings (ectopic ACTH)

Other syndromes include SIADH, Lambert-Eaton

BONUS – which test would be negative and support a dx of ectopic ACTH production

High-dose dexamethasone suppression test



By Gacaferri Lumezi B, Goci A, Lokaj V, Latifi H, Karahoda N, Minci G, Telaku D, Gercari A, Kocinaj A - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4103002/, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=122451128

65 y.o. woman presents with progressive pain in the hands and dry cough. She has never smoked. On exam, there is clubbing of the distal phalanges. CXR shows a large pulmonary nodule. Most likely Dx?

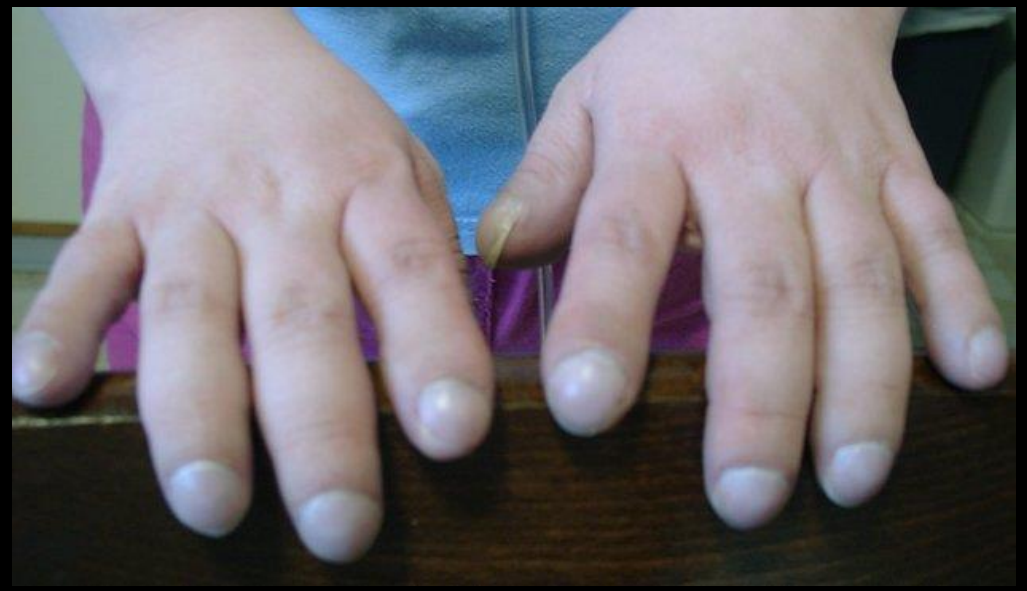
Lung adenocarcinoma

Hands?

Hypertrophic osteoarthropathy (considered paraneoplastic)

Where would you expect the nodule on XR?

Peripheral



Case study, Radiopaedia.org (Accessed on 29 Aug 2024) https://radiopaedia.org/cases/36251

Obstructive Diseases

Characterized by?

FEV/FVC ratio <80%

Examples?

COPD

Asthma

Bronchiectasis

Physiology?

Obstruction of air flow, air trapping

60 year old M PMH 40 year smoking hx 1 ppd, HTN, HLD, does not regularly follow with PCP. He has noted chronic cough for several months which has gotten worse over the last several days with increased cough productive of yellow-green sputum. He recently had exposure to his son who had rhinorrhea, fever, and malaise that resolved spontaneously. PE significant for decreased air movement, prolonged expiratory phase, diffuse rhonchi bilaterally.

Dx?
COPD exacerbation (AECOPD)
Cardinal sx?
Change in dyspnea or cough, increased sputum, increased cough
Tx?
Duonebs
Empiric abx (usually, esp. If increased cough/sputum) - Azithromycin/Doxy/Augmentin
Steroids (methylprednisolone/prednisone)
O2 support
What is the goal O2 sat? Why?
88-92% - chronic CO2 retainers, rely on hypoxic respiratory drive. If you give them too much O2 -> decreased respiratory drive -> worsening hypercapnia -> "CO2 narcosis", can present with deteriorating mental status
Most common preceding event
Infection (H. Influenzae)
What treatments DECREASE MORTALITY in COPD?
Smoking cessation and HOME O2 IF (PaO2 <55, SaO2 <88% at rest OR better numbers with signs of pulm HTN/CHF/polycythemia)

25 y.o. M presents to the ED with chest tightness and shortness of breath. He has a known history of asthma with multiple exacerbations. Recently, he has been sick with URI symptoms, and has been out of his rescue inhaler. On exam, he is tachypneic and looks fatigued. Best next step to evaluate his respiratory status?

ABG

His ABG: pH 7.34, PaO_2 60, $PaCO_2$ 42, HCO_3 23

Best next step in management?

INTUBATE – his $PaCO_2$ is wnl, in someone like this who is hyperventilating, he should be blowing it all off, this signals imminent respiratory fatigue/failure

Otherwise, how do we manage exacerbations?

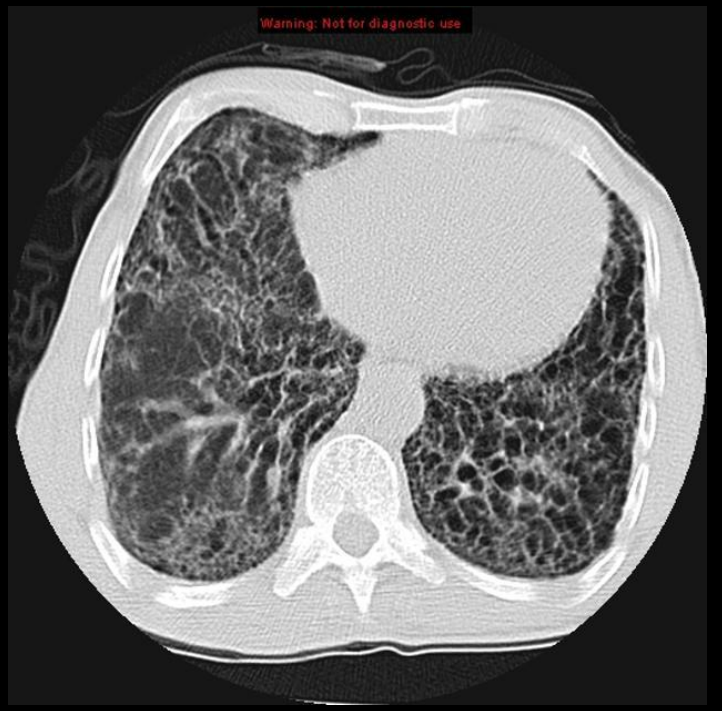
Duonebs, PO/IV steroids, O_2 as needed, MAYBE IV mag sulfate (not HY)

Asthma Treatment Ladder – an aside…

- In flux - GINA 2023 vs. NAEPP in 2020 (more tested IMO)
  - Based on "steps" determined by severity/response to tx
- Based on the NAEPP guidelines, and most tests:
  - 1st line: PRN SABA
  - If on SABA only, and its not cutting it, add ICS
  - If you are still having trouble, add a LABA
  - If needing more help, add a LAMA OR weird stuff (biologics, daily steroids, etc.)
- The big addition from GINA 2023 – can use budesonide/formoterol as a first line PRN agent
  - This is a LABA/ICS combination
- One extra point: exercise-induced asthma -> SABA OR ICS/LABA 10-15 min before exercise

Restrictive Lung Disease

Characterized by?
FEV/FVC ratio >80%
Examples?
Extrinsic
Pneumoconioses
Sarcoidosis
Idiopathic pulmonary fibrosis
Hypersensitivity pneumonitis
Drug toxicity
Physiology?
Restricted lung expansion



Al Salam H, Usual interstitial pneumonia (UIP). Case study, Radiopaedia.org (Accessed on 29 Aug 2024) https://doi.org/10.53347/rID-13199

50 yo M presenting with SOB and following CXR. Dx?

Sarcoidosis

"the great mimicker"

Path findings?

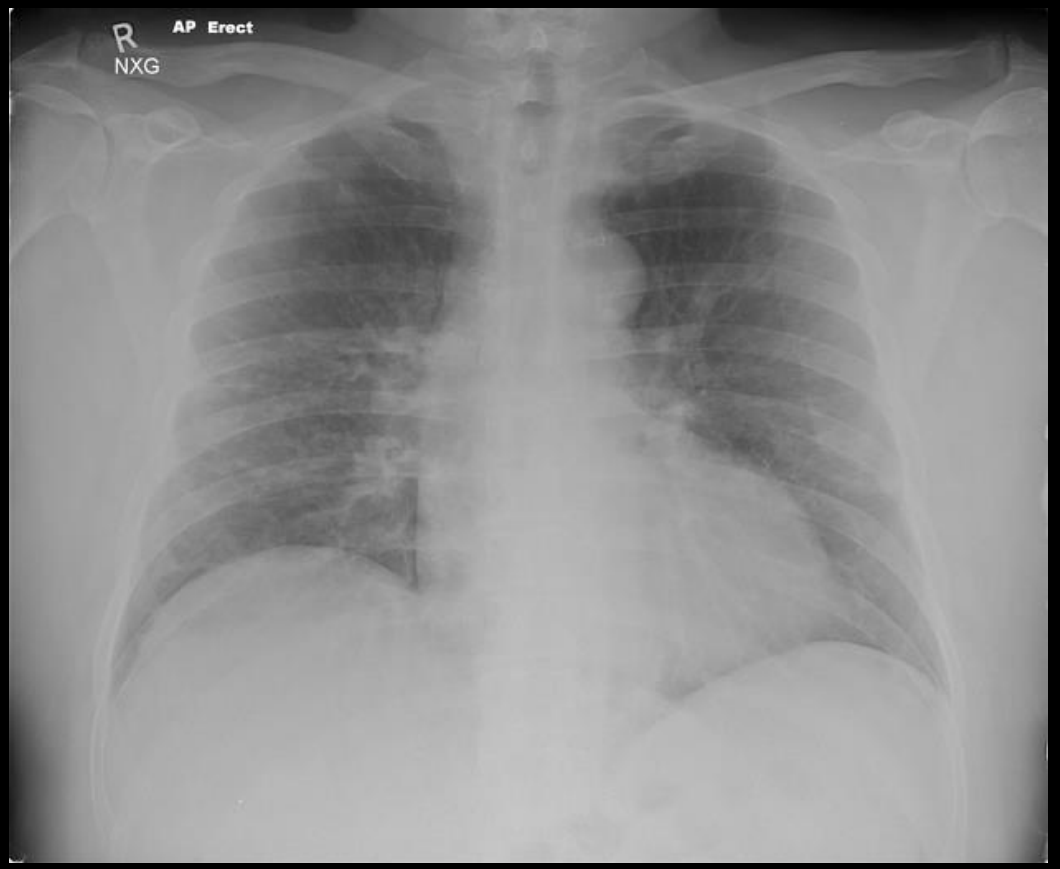
Noncaseating granuloma

Possible lab finding?

Hypercalcemia (1a-hydroxylase), elevated ACE

Tx?

Steroids if symptomatic



Harvey J, Pulmonary sarcoid. Case study, Radiopaedia.org (Accessed on 29 Aug 2024) https://doi.org/10.53347/rID-70938

60 year old woman presenting with dyspnea, leg swelling, fever. Owns pigeons.

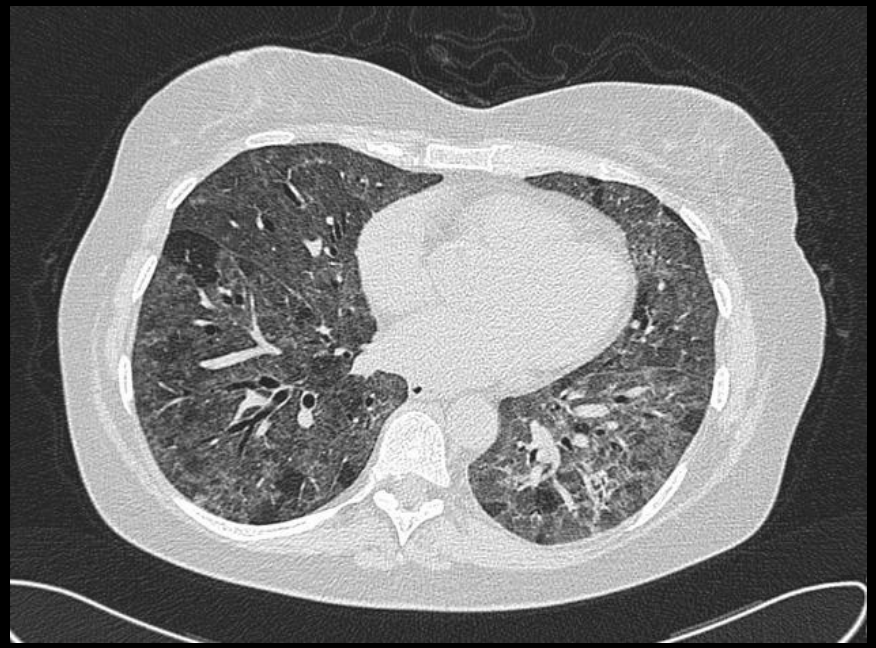
Hypersensitivity pneumonitis

Path findings?

Noncaseating granuloma, fibrosis

Tx?

Avoid offending trigger, Steroids



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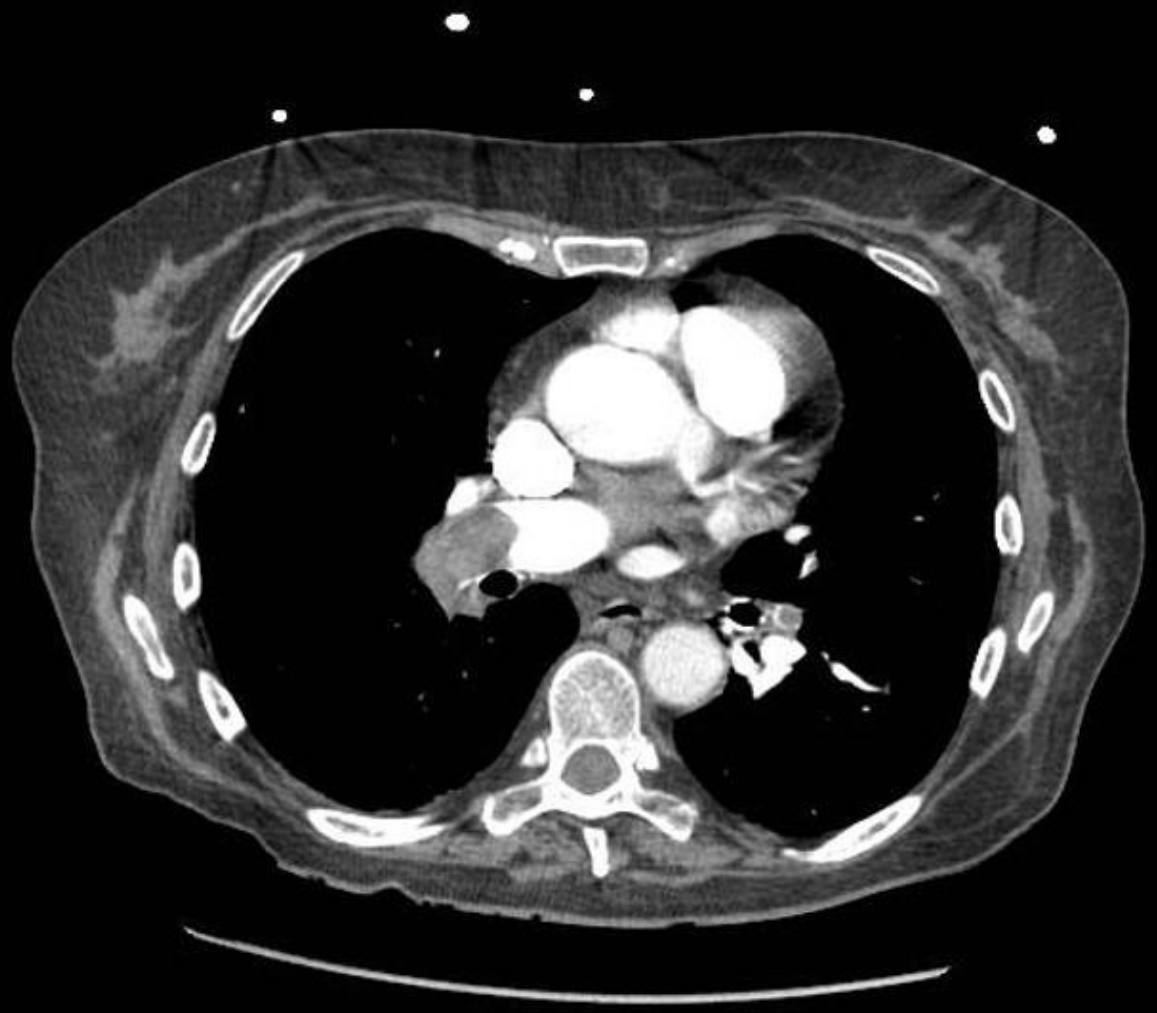


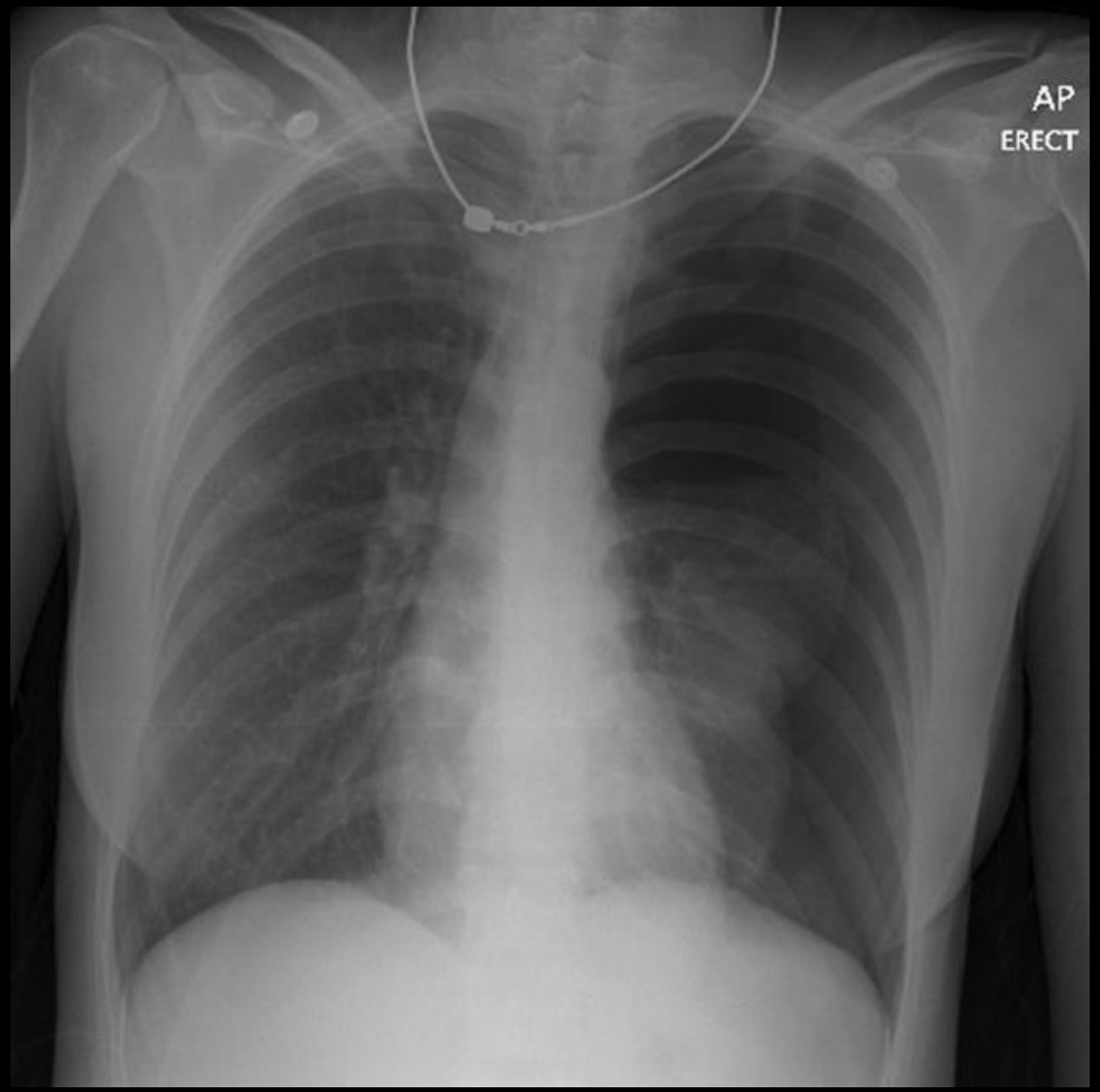
Jones J, Massive pulmonary embolism. Case study, Radiopaedia.org (Accessed on 29 Aug 2024) https://doi.org/10.53347/rID-13211

Dx?
PE

Next step if hemodynamically unstable?
Call PE response team (PERT) if available (thrombolytics vs thrombectomy)

How to dx if pregnant?
V/Q scan

How to tx if stable?
LMWH/UFH, can just start a DOAC if low-risk and continue for ~3 months



Dx?

Tension pneumothorax

Next step?

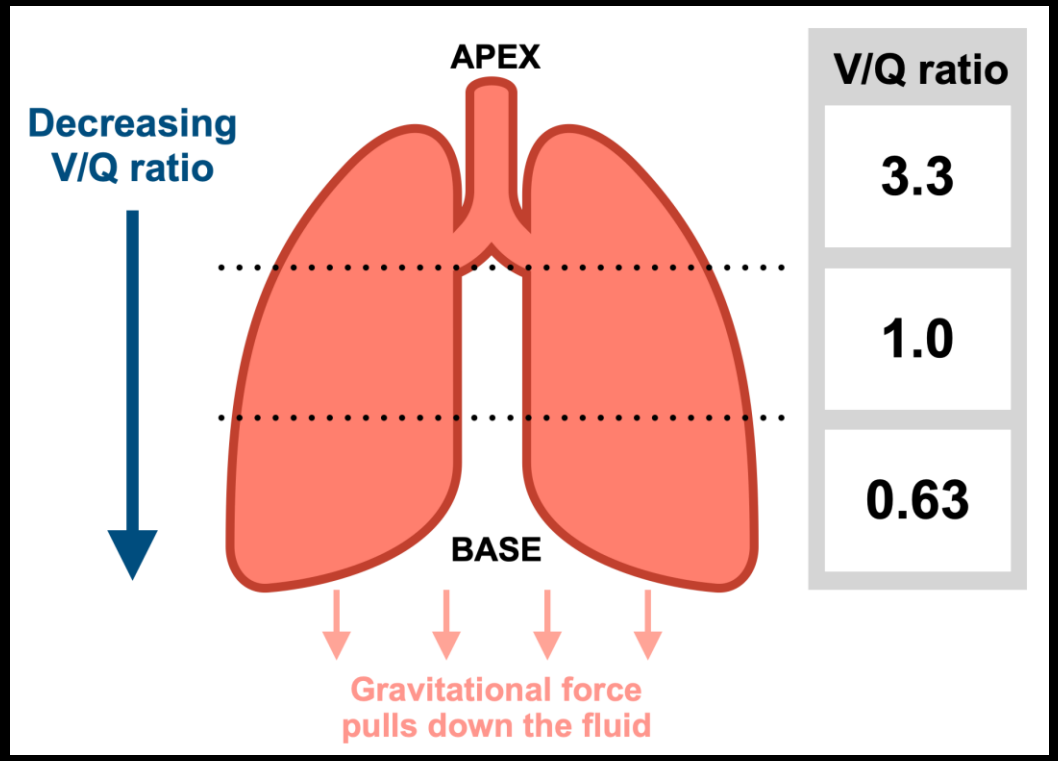
Needle thoracostomy

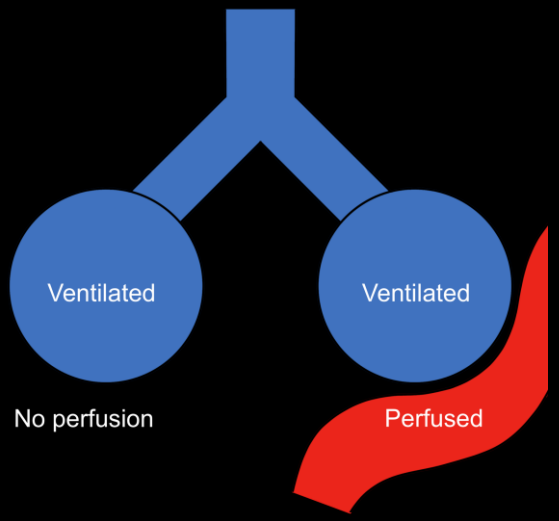
+/- 3 sided seal

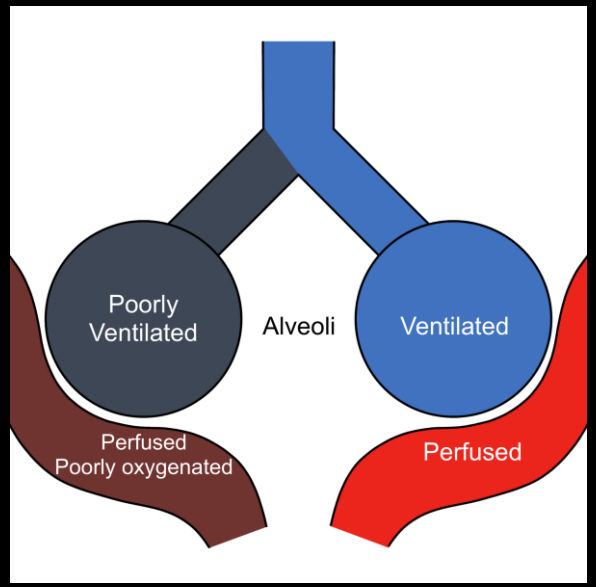
Chest tube placement

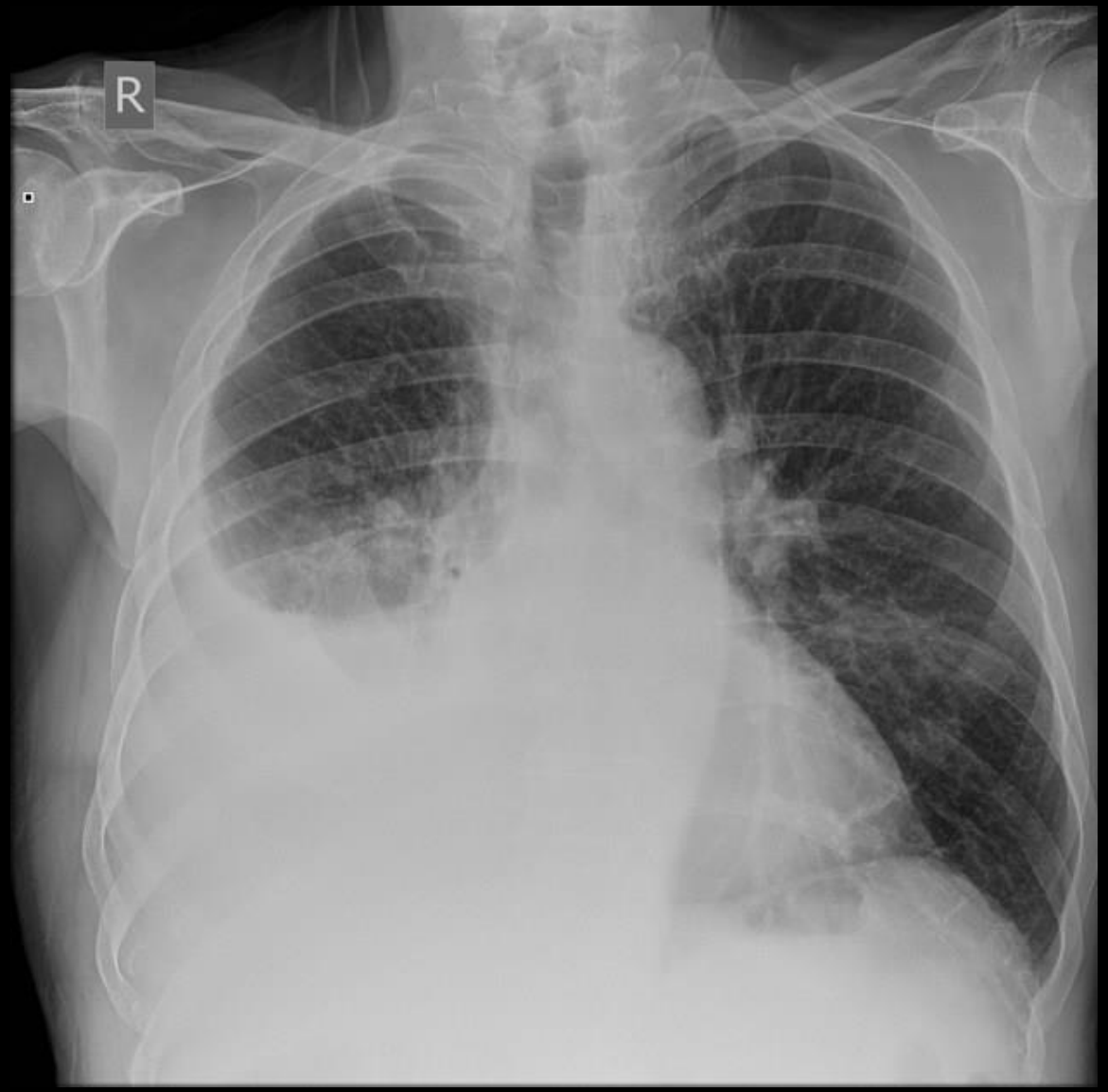
Gaillard F, Tension pneumothorax. Case study, Radiopaedia.org (Accessed on 29 Aug 2024) https://doi.org/10.53347/rID-10558

V/Q Mismatch (Hypoventilation vs. Dead space vs. Perfusion defect)









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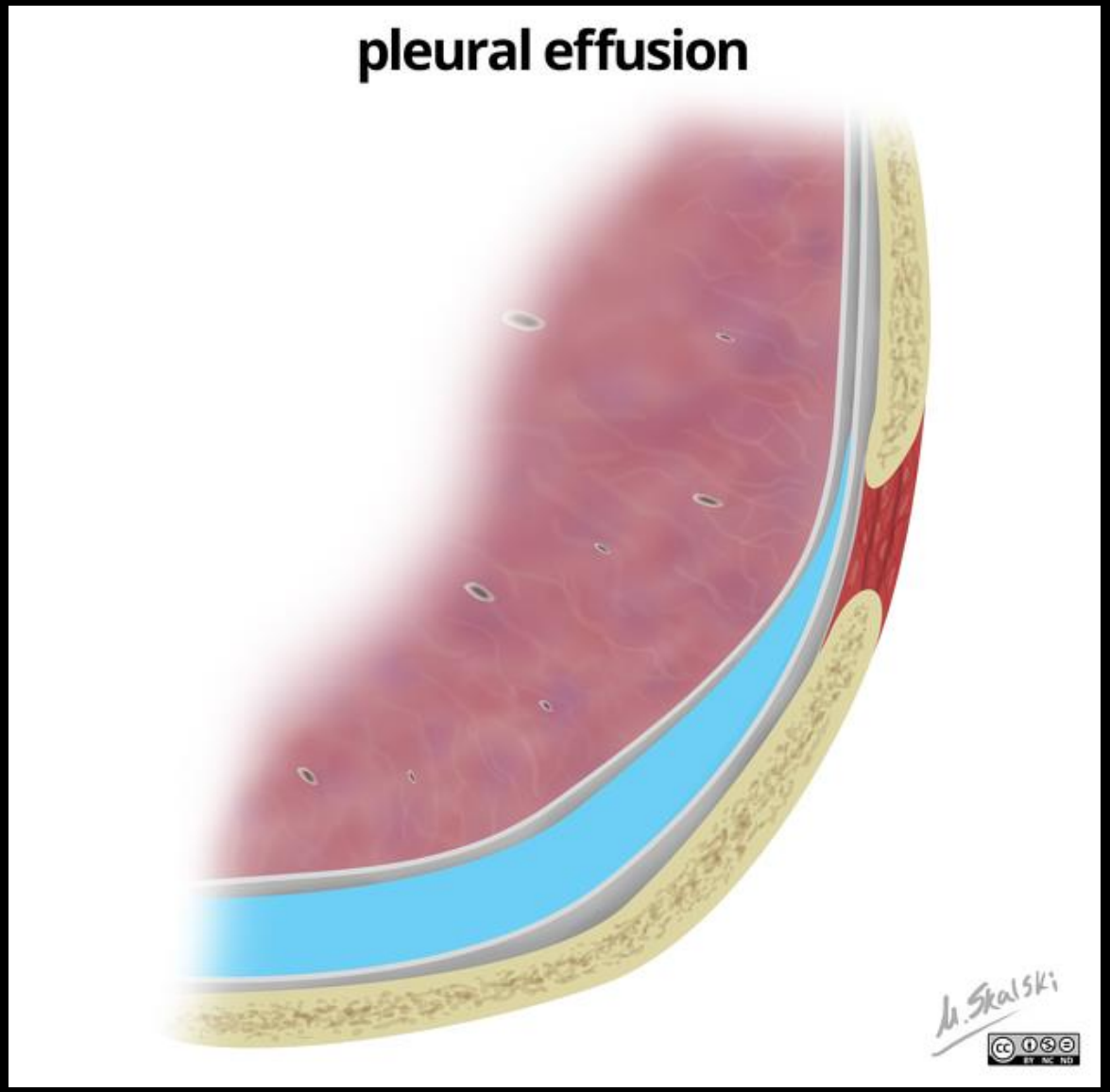

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Transudative Pleural Effusions

Determining transudative pleural effusions?

Light's Criteria:

Pleural fluid protein/Serum protein >0.5.

Pleural fluid LDH/Serum LDH >0.6.

Pleural fluid LDH >2/3 *Serum LDH upper limit of normal

Causes?

CHF, cirrhosis

Southwest Respiratory and Crit care chronicles

Exudative pleural effusions

Causes?

TB

Malignancy

RA

Southwest Respiratory and Crit care chronicles

OSA

Defined by?

Repeated cessation of breathing during sleep

STOP BANG score-https://www.mdcalc.com/calc/3992/stop-bang-score-obstructive-sleep-apnea

Confirm dx?

Polysomnography

Types of sleep apnea?

Obstructive vs Central

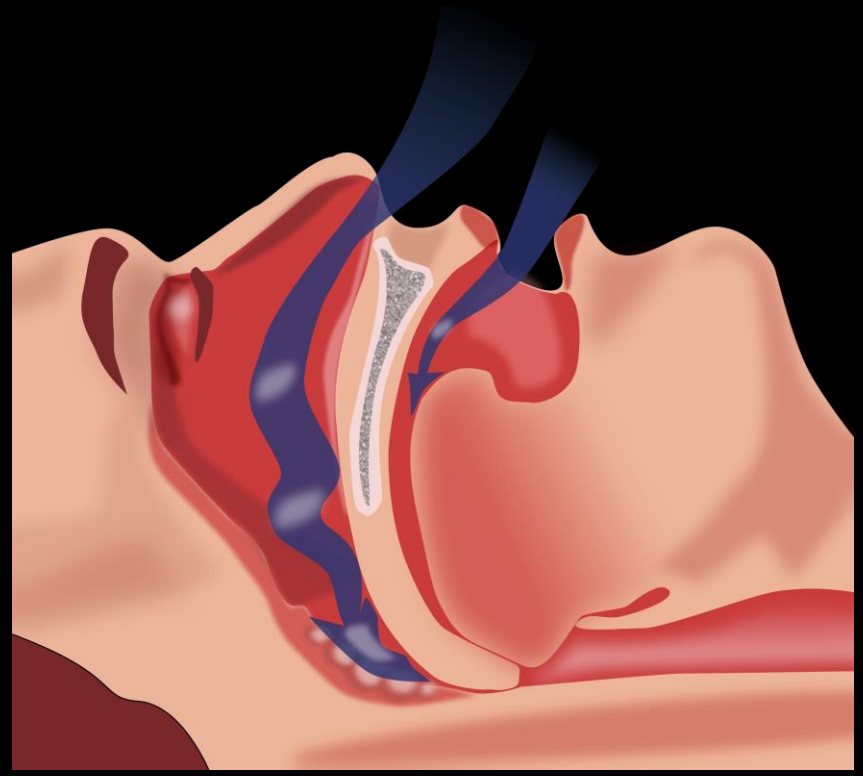
Obesity hypoventilation syndrome

Associated with what arrhythmia?

Atrial fibrillation

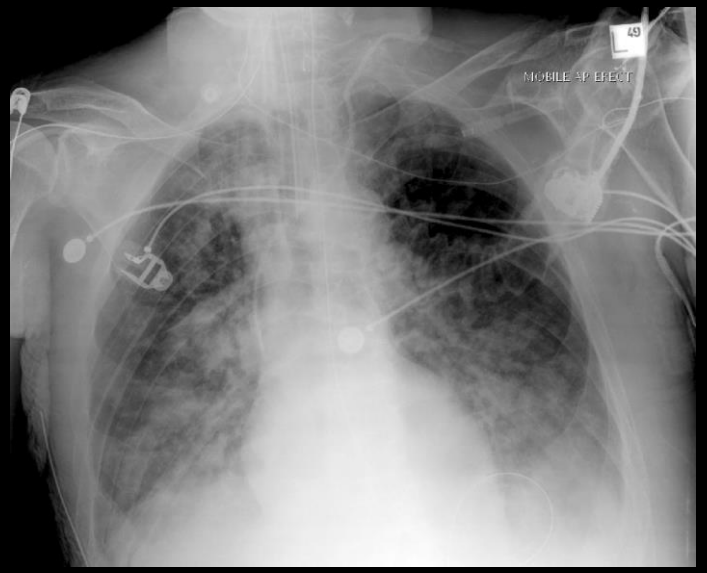
Treatment?

Weight loss, CPAP



By Habib M'henni/ Habib M'henni - Own work

45 y.o. M presents to the ED after an accident at sea. He was found by members of his family, unconscious in the water. He was resuscitated in the field, but has been vitally stable. He is admitted for futher workup of his episode of LOC. On day 2 of hospitalization, the patient begins to have increased O2 demand, tachypnea, and tachycardia. On exam, there are diffuse crackles and he is cyanotic. STAT CXR is shown below.



Case courtesy of Frank Gaillard, Radiopaedia.org, rID: 35985

Dx?

ARDS

Criteria?

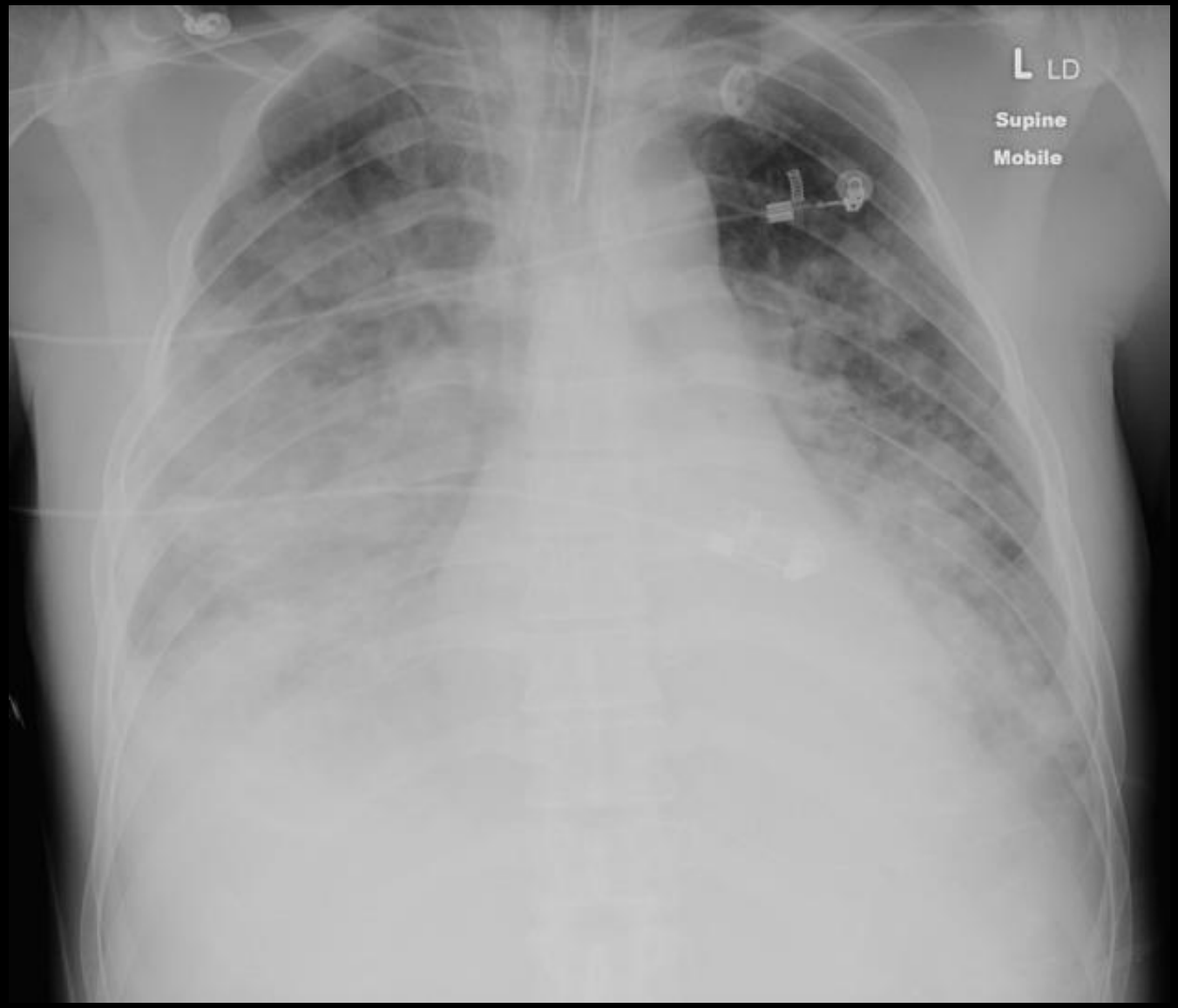
Within 1 week of insult, not explained by cardiac findings, PaO2/FiO2 ratio <300, bilateral findings

Causes?

Drowning (due to surfactant washout), pulmonary infections/sepsis, aspiration events, pancreatitis, shock, trauma, drugs

Tx?

PEEP, address underlying, consider intubation



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https://doi.org/10.53347/rID-53759

Cystic Fibrosis

Associated symptoms?

Malabsorption (pancreatic insufficiency, diarrhea), diabetes, sweat dehydration, infertility due to absent vas, recurrent pulmonary infections

What would you see on sinus exam?

Nasal polyps – HIGH YIELD, what about other causes?

18 y.o. patient with known CF presents with S/Sx of PNA. What's the most likely bug?

Staph aureus

30 y.o. patient with known CF presents with S/Sx of PNA. Most likely bug?

Pseudomonas

Drugs with pulmonary effects

Pulmonary fibrosis:

Methotrexate, Nitrofurantoin, Carmustine, Bleomycin, Busulfan, Amiodarone

Obtain what baseline testing for amiodarone?

LFTs, PFTs, thyroid function

Miscellaneous

30 y.o. female is s/p septoplasty. She is noted to develop a post-operative hematoma. On follow-up, she reports a whistling sound with breathing. Diagnosis?

Nasal septal perforation

Other causes?

GPA, Cocaine, Trauma

40 y.o. M presents to the ED after an MVC. There is extensive bruising over the L chest wall with associated rib fractures. He is admitted, and post-operatively develops respiratory distress. A CXR is done and it shows an irregular area of diffuse, patchy infiltrate over the left lung that is not confined to any particular lobe.

Dx?

Pulmonary contusion

Tx?

Supportive care, monitor as can lead to ARDS